



Oxiperm®C 164 **Fully automatic chlorine dioxide** **processing plant** **164-4000C, -6000C, -7500C,** **-10000C**

Service manual



Imprint

Oxiperm® C 164
Fully automatic chlorine dioxide
processing plant
164-4000C, -6000C, -7500C, -10000C

Service manual

Version 2.0

Issued by:

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Installation data



NOTE

Please fill in this form following commissioning. It will help you and your ALLDOS servicing partner to adjust the unit during subsequent corrections.

Owner:
Grundfos Alldos customer No.:
Contract No.:
Order No. of unit:
Serial No. of unit:
Put into service on:
Location of unit:
Used for:

Installation diagram

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1 General



NOTE

In accordance with the regulations for the prevention of accidents GUV 8.15 and VGB 65 § 19 (2), the safety of the chlorine dioxide systems must be checked by an expert on a regular basis, and at least once a year and before each start-up.

These checks can be carried out by the service centre within the framework of a 6 month or annual maintenance check.



WARNING!

Before any maintenance work is carried out, i.e. if parts and gaskets are replaced, the whole installation must be flushed with water.

When maintenance work is carried out, all remains of chemicals must be removed.

When working with acids or lyes, ensure that the necessary protective clothing is worn.

Maintenance and repair work may only be carried out by authorised qualified personnel.

1.1 Spare parts set

Each spare parts set includes the following parts:

- Spare parts set for the dosing pump (diaphragms, valves, O-rings)
- Spare parts set for suction pulsation damper valves
- Spare parts set for valves
- Spare parts set for the suction injector of the batch container
- Ball check valve
- O-rings for: Bypass line DN20, impeller counter, circulating pump

2 Preparing the installation for maintenance

For maintenance work which involves replacing components, the dosing pumps for HCl and NaClO₂ and the reactor must be flushed with demineralised water and the bypass line with process water, in order to avoid direct contact with chemical residues.



NOTE

Any remaining ClO₂ solution in the batch container should be dosed before the dry-run contact (MIN-MIN) or empty the batch container over the evacuation ball valve, to neutralise the ClO₂ solution.

2.1 Emptying the suction pulsation damper

Here, chemicals are emptied out of the suction pulsation damper.



WARNING

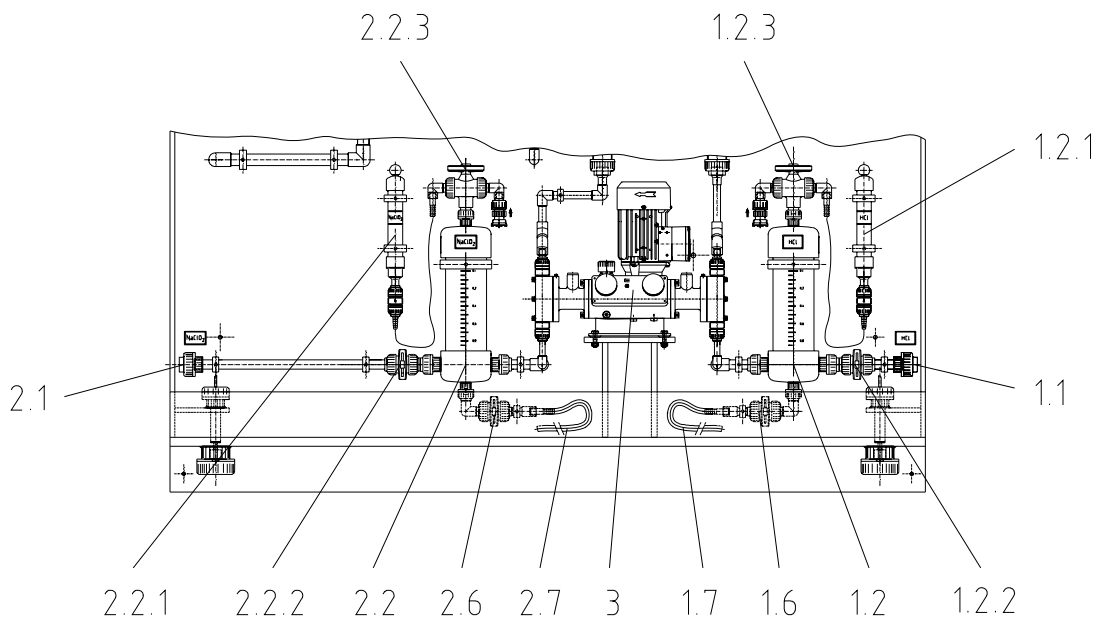
Chemicals should be emptied separately!



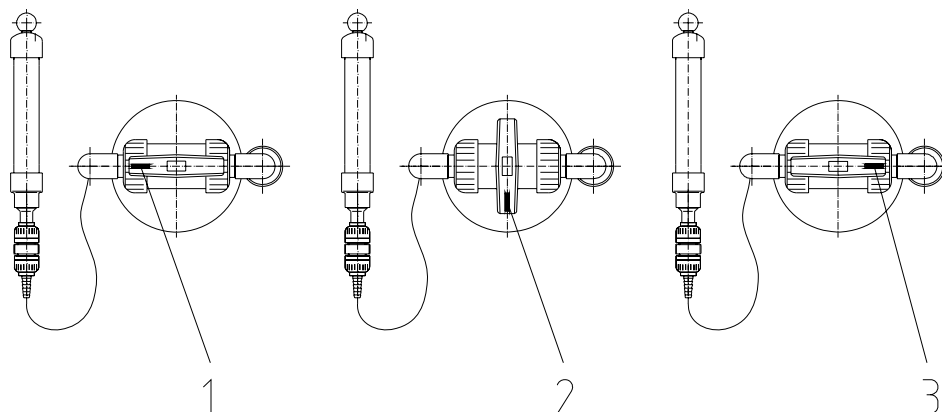
WARNING

Components with 33% hydrochloric acid and 24.5% sodium chloride must not be mixed together as a concentrated solution!

If undiluted, components with 33% hydrochloric acid and 24.5% sodium chloride are an explosive solution concentration!



- Close ball valves, pos. 1.2.2 and 2.2.2, for the feed line of chemicals



- Place hose, pos. 1.7 in an empty container, set ball valve above the suction pulsation damper, pos. 1.2.3 to "Aeration" (screen 2, pos. 3) an open the ball valve, pos. 1.6. The suction pulsation damper is now emptied.

- Place hose, pos. 2.7 in a **separate** empty container, set ball valve above the suction pulsation damper, pos. 2.2.3 to "Aeration" (screen 2, pos. 3) and open ball valve, pos. 2.6. The suction pulsation damper is now emptied.



WARNING

Do not mix concentrated chemicals! Use separate containers!

2.2 Filling the suction pulsation dampers

Here, the suction pulsation dampers are filled with demineralised water, in order to eventually flush the dosing pump and the dosing lines.

Suction pulsation damper for HCl

- Place hose, pos. 1.7 in a container which is filled with demineralised water, set ball valve above the pulsation damper, pos. 1.2.3 to Suction (screen 2, pos. 1), open ball valve, pos. 1.6 and using the manual vacuum pump, pos. 1.2.1, suction the water in the pulsation damper. Fill the pulsation damper to the top of the transparent tube.
- Close ball valve, pos. 1.6
- Set ball valve above the pulsation damper, pos. 1.2.3 to "Closed" (screen 2, pos. 2).

Suction pulsation damper for NaClO₂

- Place hose, pos. 2.7 in a container which is filled with demineralised water, set ball valve above the pulsation damper, pos. 2.2.3 to Suction (screen 2, pos. 1), open ball valve, pos. 2.6 and using the manual vacuum pump, pos. 2.2.1, suction the water in the pulsation damper. Fill the pulsation damper to the top of the transparent tube.
- Close ball valve, pos. 2.6
- Set the ball valve above the pulsation damper, pos. 2.2.3 to "Closed" (screen 2, pos. 2).

2.3 Rinsing the dosing pump, pipe lines and reactor

Here, the installation is flushed with demineralised water or in part with process water.

Rinsing the dosing pump and lines for HCl and NaClO₂

- Switch to “Service operation/Deaeration” mode on the display
- Switch to “Pump NaClO₂ / HCl” menu
- Activate dosing pump

The dosing pump is runs under time control and switches off after approximately 3 minutes.



NOTE

The dosing pump and time control can be stopped at any time by pressing the “ESC” key.



NOTE

If the suction pulsation damper is emptied before the time control switches off the dosing pump, this process should be stopped by pressing the “ESC” key. The pulsation damper should then be filled again with demineralised water.

To rinse the dosing pump or pipe lines for HCl or NaClO₂ requires approximately 3-4 fillings of the suction pulsation damper.

- Deactivate the dosing pump (time controlled or “ESC” key)

Rinsing the reactor

- Switch to “Service operation/Deaeration” mode on the display
- Switch to the “Bypass line” menu
- Press the “F3” key to activate or deactivate the rinsing operation.

The reactor is now flushed with water.



NOTE

The rinsing process remains active until the water level in the solution container (batch container) reaches MAX contact. The solution container should then be dosed again or emptied. If it is emptied, the solution in the container should be neutralised.

- Once the MAX contact is reached, deactivate the rinsing process.

All lines and even the reactor are now flushed with water.

3 Tests every 6 months

During these tests, the following functions or components are checked, and if necessary cleaned or replaced.

3.1 Checking the solenoid valves

Here, the function of existing solenoid valves is checked.

- Solenoid valves of the bypass line
- Solenoid valves for the rinsing line
- Solenoid valves for suction of batch container



NOTE *If a solenoid valve is faulty, it must be replaced.*

Spare valves

45.10245-3/4	Solenoid valve 230V, 50Hz
45.10249-3/4	Solenoid valve 115V, 60Hz

3.2 Checking the pressure reducer or filter

Here, the operation of the pressure reducer and the condition of the filter are checked.

- Check the pressure adjustment
- Check the filter, clean if necessary



NOTE *In the event of a fault, the component must be replaced.*

Part No.	Designation	Installation
53.600-1	Pressure reducer 1"	164-4000C / 164-6000C
53.600-11/4	Pressure reducer 1 1/4"	164-7500C / 164-10000C

3.3 Check information signs

Here, the legibility of all system signs or labels is checked

- “Warning” label
- “HCl” label on dosing pump
- “NaClO₂” label on dosing pump



NOTE

If the labels are illegible or damaged, they must be replaced.

Label

Part No.	Designation	Installation
12.6029-300	“Warning” label	all
12.6028-410	“HCl” label	all
12.6028-400	“NaClO ₂ ” label	all

3.4 Relay connection for control system

Here, all relay connections are checked. To check on the display, switch to service mode/test mode/relay. The following relays can be checked:

- Dosing pump NaClO₂ / HCl
- Bypass line (solenoid valve)
- Suction of solution container (solenoid valve)
- Electrically isolated output - Auto/Manual
- Electrically isolated output - error messages
- Electrically isolated output - pre-empty signals
- Electrically isolated output - dry-run batch container
- Rinsing line (solenoid valve)
- Pump for H₂O

3.5 Suction injector for the solution container

Here, the operation (suction ability) of the suction injector is checked.

- Remove vacuum hose above suction injector
- Switch to “Service operation/Deaeration” mode on the display
- Switch to the “Bypass line” menu
- Press the “F2” key to activate or deactivate the suction operation.

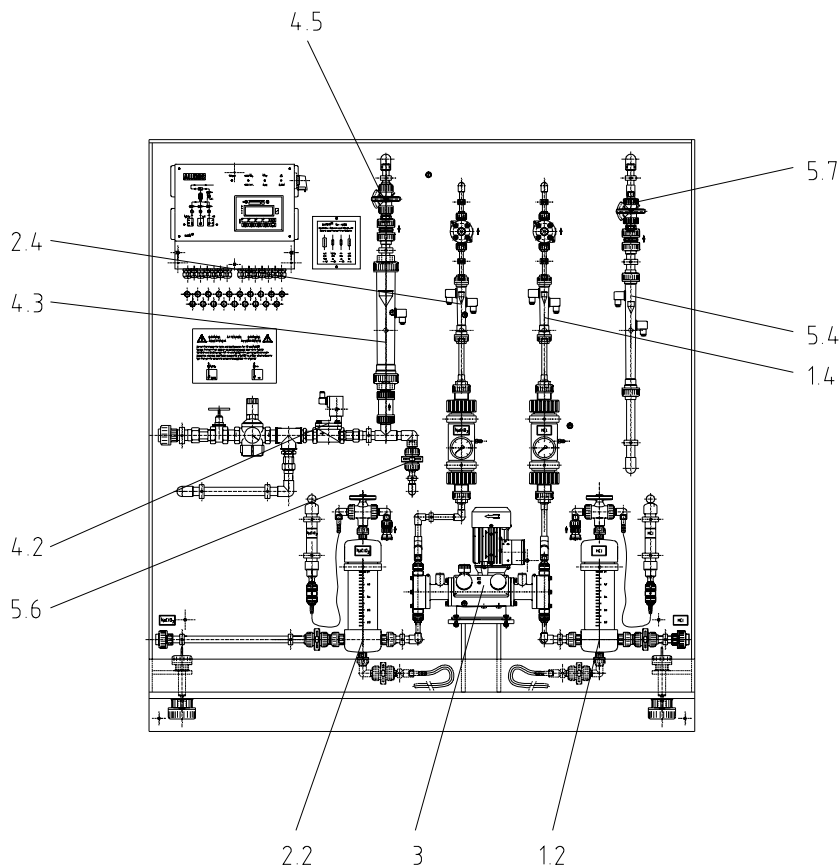
Apply a piece of paper to check the suction ability of the suction injector. If there is no suction, the following points should be checked:

- Counterpressure of the pipe line after the suction injector, the pressure may be too high
- Nozzle and diffuser are clogged, Clean components

3.6 Checking the dosing flow of the pumps for HCl, NaClO₂ and the setting of the water volume for predilution and bypass

Here, the performance of the dosing pumps for HCl and NaClO₂ is checked and also the quantities of water that are used to predilute HCl and the bypass water for the solution container.

Settings, see table



- Checking the dosing pump for HCl on the measuring tube, pos. 1.4, adjust the dosing pump if necessary, pos. 3, right hand wheel
- Checking the dosing pump for NaClO₂ on the measuring tube, pos. 2.4, adjust the dosing pump if necessary, pos. 3, left hand wheel
- Checking the water quantity to predilute HCl on the measuring tube, pos. 5.4, adjust if necessary using the ball valve, pos. 5.7
- Checking the bypass water volume on the measuring tube, pos. 4.3, adjust is necessary, using the ball valve, pos. 4.5

System	ClO ₂ generation performance *		Consumption of components *		Dilution water requirement for bypass system				Op. pressure
	(kg/h)	(l/h)	NaClO ₂ /HCl (l/h)	H ₂ O (l/h)	Bypass (with 3 g/l) (l/h)	Prelim. dilution for HCl (l/h)	Suction from solution tank (l/h)	Total water quantity (l/h)	
164-4000C	4	1333	24	24	1150	140	1400	2690	4 - 5
164-6000C	6	2000	37	37	1720	215	1900	3835	4 - 5
164-7500C	7,5	2500	47	47	2150	265	2300	4715	4 - 5
164-10000C	10	3333	63	63	2860	355	3100	6315	4 - 5

3.7 Float in the solution container

Here, the float and the guide pipe are checked for contamination.

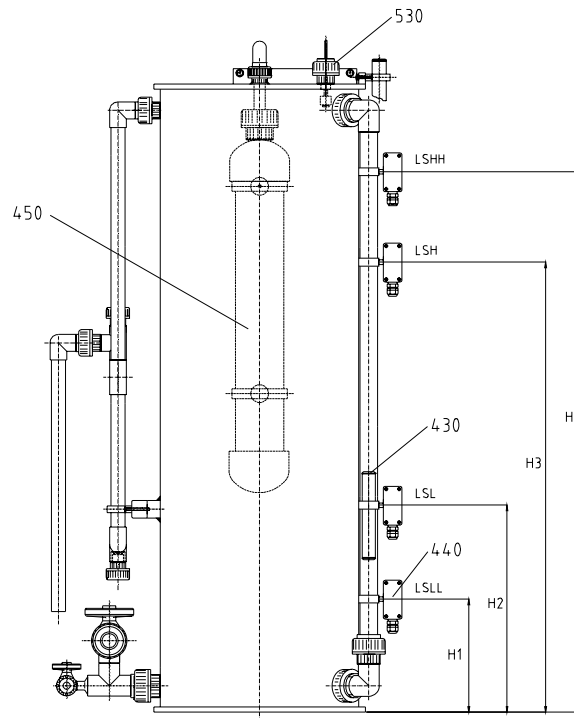
- Check float for contamination (visual check)
- Check the guide pipe for contamination (visual check)

In the event of a fault due to contamination, clean the guide pipe and float.



NOTE

Before you remove the guide pipe, dose or empty the solution in the container (if present).



3.8 Pump for H₂O predilution for HCl

Here, the operation of the H₂O pump is checked for the predilution of hydrochloric acid.

- H₂O pump



NOTE

In the event of a fault, the component must be replaced.

Spare pump

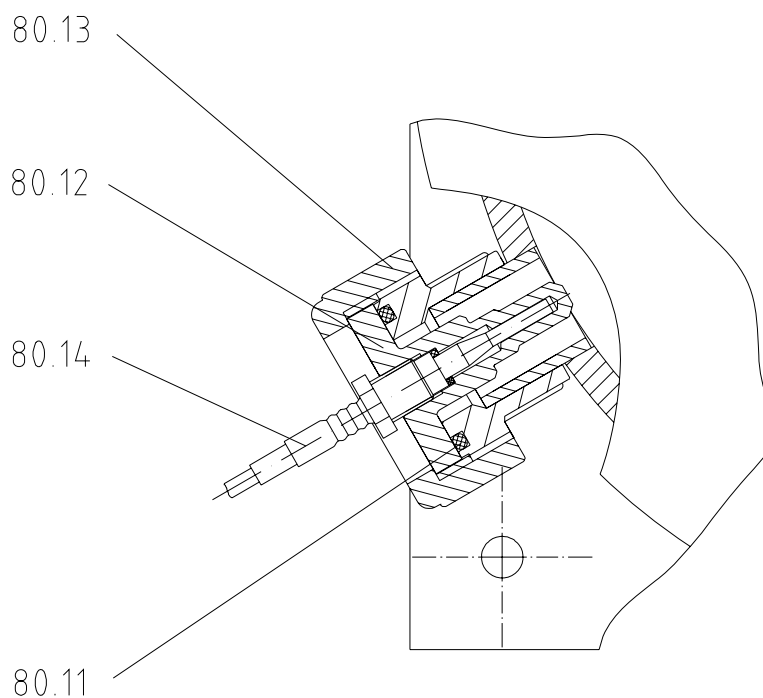
12.6443-400	Solenoid valve 230V, 50Hz
12.6443-410	Solenoid valve 115V, 60Hz

3.9 Temperature sensor

For maintenance work, the temperature sensor should be checked for damage or corrosion on the end of the sensor.

The temperature sensor is screwed into an orifice and therefore does not come into direct contact with the chlorine dioxide solution in the reactor.

- Unscrew the sensor from the orifice, check it and then screw it back into the orifice.



WARNING

If the union nut, pos. 80.13 is removed, there is the danger that the contents of the reactor is released into the open!

Spare parts

Pos.	Part No.	Designation
80.11	52.141	O-ring, Viton
80.12	12.6155-400	Orifice for sensor, PTFE/carbon
80.13	53.058-25	Union nut DN20
80.14	48.978-2	Temperature sensor



NOTE

If the orifice is to be replaced, the reactor should first of all be emptied using the evacuation ball valve.

4 Maintenance and tests every 12 months

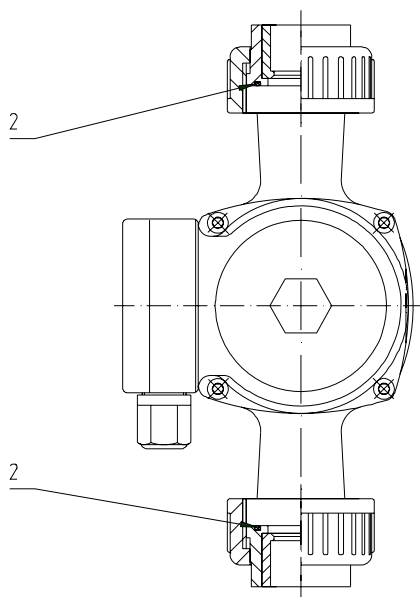
During these maintenance tests, the following components are checked, and if necessary cleaned or replaced.

4.1 Tests

- Solenoid valves for bypass line, rinsing line and suction injector (See Section 3.1)
- Checking the pressure reducer or filter (See Section 3.2)
- Check information signs (See Section 3.3)
- Check relay connection for control system (See Section 3.4)
- H2O pump for predilution of hydrochloric acid (See Section 3.8)
- Check float in the solution container (See Section 3.7)
- Check flow limiter
- O-rings of union pieces

4.1.1 Solenoid valves or H2O pump

Here, the operation and tightness of the solenoid valves or H2O pump is checked.



- Switch to “Service operation/Deaeration” mode on the display
- Switch to the “Bypass line” menu
- Switch solenoid valves on to check the operation and tightness, replace solenoid valves if necessary
- Switch to “Service operation/Deaeration” on the display, reset if necessary using the “ESC” key
- Switch to the “H2O pump” menu and activate pump
- The specified amount of water on the display must be within the set tolerances.
- Check tightness of the H2O pump, replace if necessary
- Check connection screws and O-rings (pos. 2) of the H2O pump, replace if necessary



NOTE

Observe mounting position (flow direction)!

- Switch off solenoid valves or H2O pump

4.1.2 Flow limiter

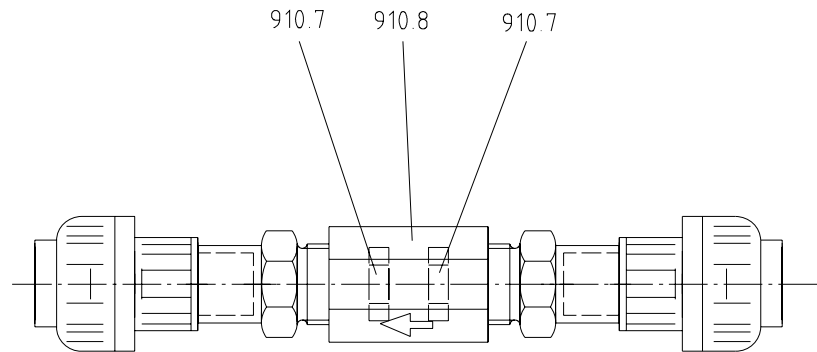
Here, the tightness of the flow limiter is checked. The flow limiter is at the rear of the installation and supplies the run-down tank for the predilution of HCl with water.

- Check tightness of flow limiter, replace flat gaskets Replace pos.910.7



NOTE

Observe mounting position (flow direction)!



4.1.3 O-rings of union pieces

Here, the tightness of all union pieces is checked.

- Replace O-rings if leaking

4.2 Maintenance

- Reactor valves and valves for rinsing line
- Ball checks in the bypass line
- Dosing pump for NaClO₂ / HCl
- Valves for suction pulsation damper
- Suction injector
- H₂O pump

4.2.1 Reactor valves and valves for rinsing line



NOTE

During these maintenance tests, the reactor valves must be fully replaced.

Spare parts set “ Valves “

Order No.	Designation	Installation
553-697.01	Valves DN8, valves DN20	164-4000C to 164-10000C



NOTE

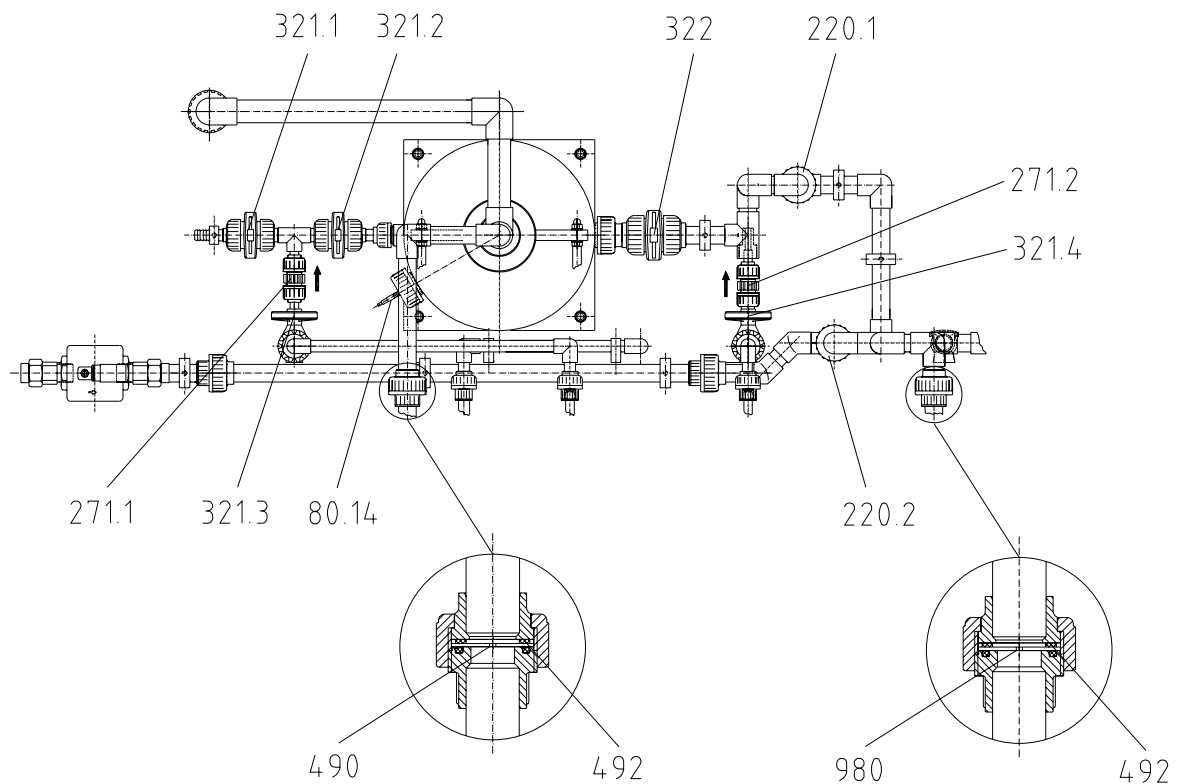
The reactor valves are not identical to the valves of the dosing pumps!

Do not interchange valves!

Pos. 271.1	Check-back valve DN8 for supply of NaClO ₂
Pos. 271.2	Check-back valve DN8 for supply of HCl
Pos. 220.1	Check-back valve DN20 for dilution water
Pos. 220.2	Check-back valve DN20 for rinsing line
Pos. 321.1	Evacuation ball valve
Pos. 321.2	Isolating ball valve (reactor)
Pos. 321.3	Isolating ball valve (NaClO ₂)
Pos. 321.4	Isolating ball valve (HCl)
Pos. 322	Isolating ball valve (reactor)
Pos. 490	Orifice for bypass water line
Pos. 492	Flat gasket (Part No. 54.142)
Pos. 980	Orifice for predilution H ₂ O

Replacing the valves

- Once the reactor has been rinsed, close ball valves, pos. 321.2, pos. 321.3, Pos. 321.4 and pos. 322.
- Replace valves DN8, pos. 271.1, pos. 271.2 and valves DN20, pos. 220.1, Pos. 220.2
- Before the installation starts up, open ball valves, pos. 321.1, pos. 321.3, Pos. 321.4 and pos. 322.



4.2.2 Ball checks of bypass line and of predilution line



NOTE

During these maintenance tests, the valves must be fully replaced.



NOTE

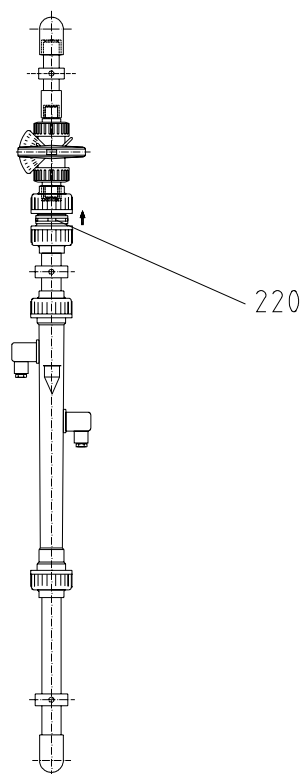
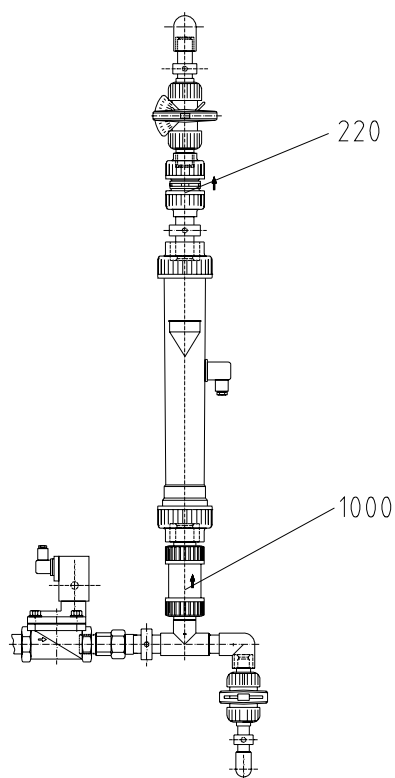
Observe mounting position (flow direction)!

Replacing valves from the bypass line

- Replace valve DN20 (Pos. 220) and valve DN20 (Pos. 1000)

Replacing the valve in the predilution line

- Replace valve DN20 (Pos. 220)



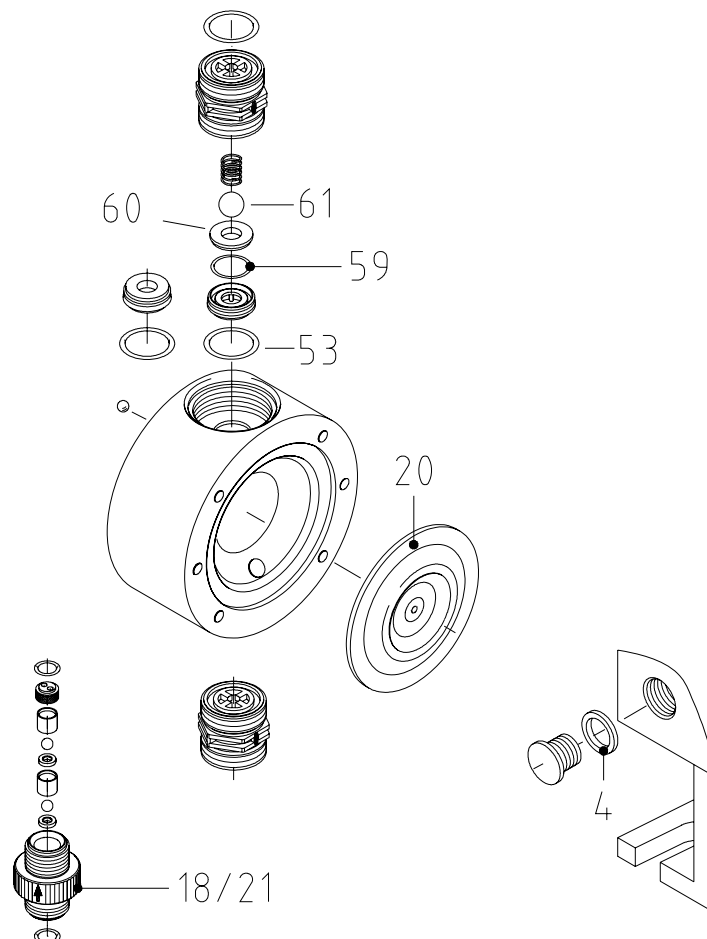
4.2.3 Removing the diaphragms from the dosing pump

Removing the diaphragm

- Loosen the connection screws on the suction side and pressure side.
- Loosen the four dosing head screws
- Remove the dosing head and unscrew the diaphragm in an anticlockwise direction.

Assembly

- Insert the intermediate ring in such a way that the relief hole is facing downwards.
- Screw in diaphragm.
- Switch on pump briefly, until the diaphragm reaches the back dead point.
- Carefully fit the dosing head and gradually tighten the screws in a diagonal sequence, so that the dosing head is not damaged.
- Deaerate the pump.



Spare parts set for dosing heads M251/M252 Order No. 553-253-6

Pos.	Part No.	Designation
4	54.001	Flat gasket, UNI blue
18	10.4700-351	Valve DN8
20	10.5805-400	Bead diaphragm, TFM 1700
21	10.7400-351	Valve DN8
40	48.905-400	Leaflet
100	48.1104-403	Insert for spare parts set

Spare parts set for dosing heads M253 Order No. 553-292-6

Pos.	Part No.	Designation
4	54.001	Flat gasket, UNI blue
20	10.4796-401	Bead diaphragm, TFM 1610
53	52.141	O-ring, Viton
59	52.146	O-ring, Viton
60	10.6505-400	Valve seat, PTFE
61	10.1838	Ball, ceramics
100	48.1104-403	Insert for spare parts set

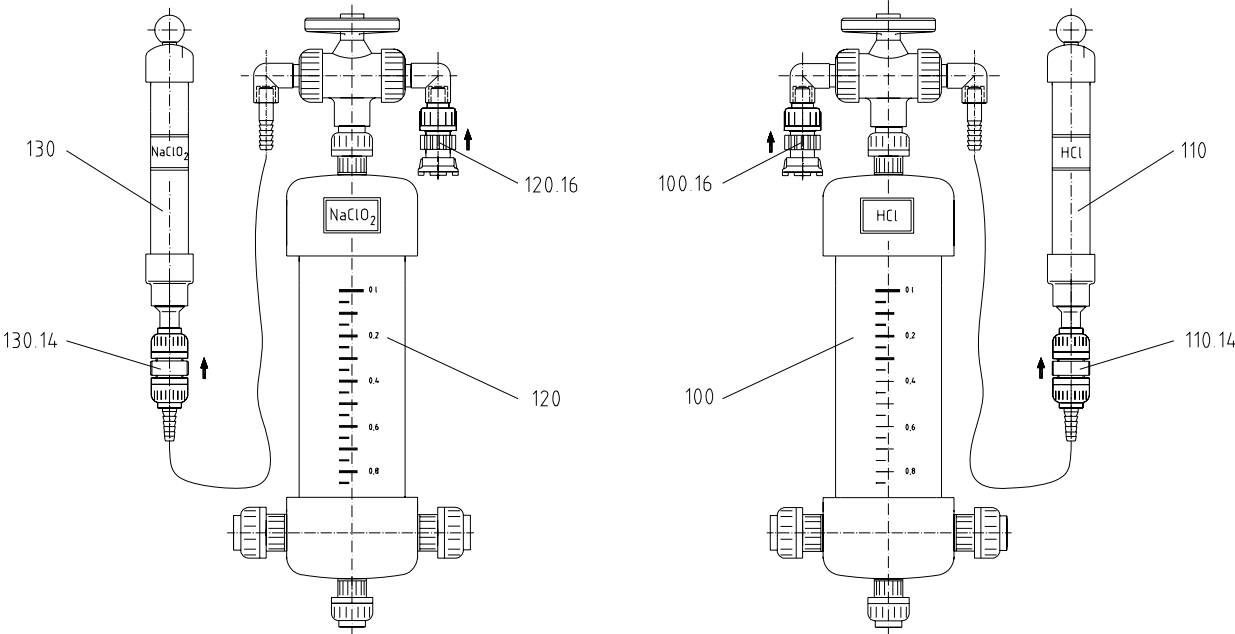
4.2.4 Valves for suction pulsation damper

- Replace valves DN8 (pos. 130.14, pos. 120.16, pos. 100.16 and pos. 110.14).



NOTE

Observe mounting position (flow direction)!



Spare parts set

Order No. 553-697.02

Pos.	Part No.	Designation	Installation
100.16	10.7400-351	Valve DN8	164-4000C to -10000C
110.14	10.7400-351	Valve DN8	164-4000C to -10000C
120.16	10.7400-351	Valve DN8	164-4000C to -10000C
130.14	10.7400-351	Valve DN8	164-4000C to -10000C

4.2.5 Servicing the suction injector

In the case of water which has a high deposit content, deposits can change the nozzle ratio of the injector in such a way that it causes a drop in performance during suction. In this case the nozzle must be cleaned.

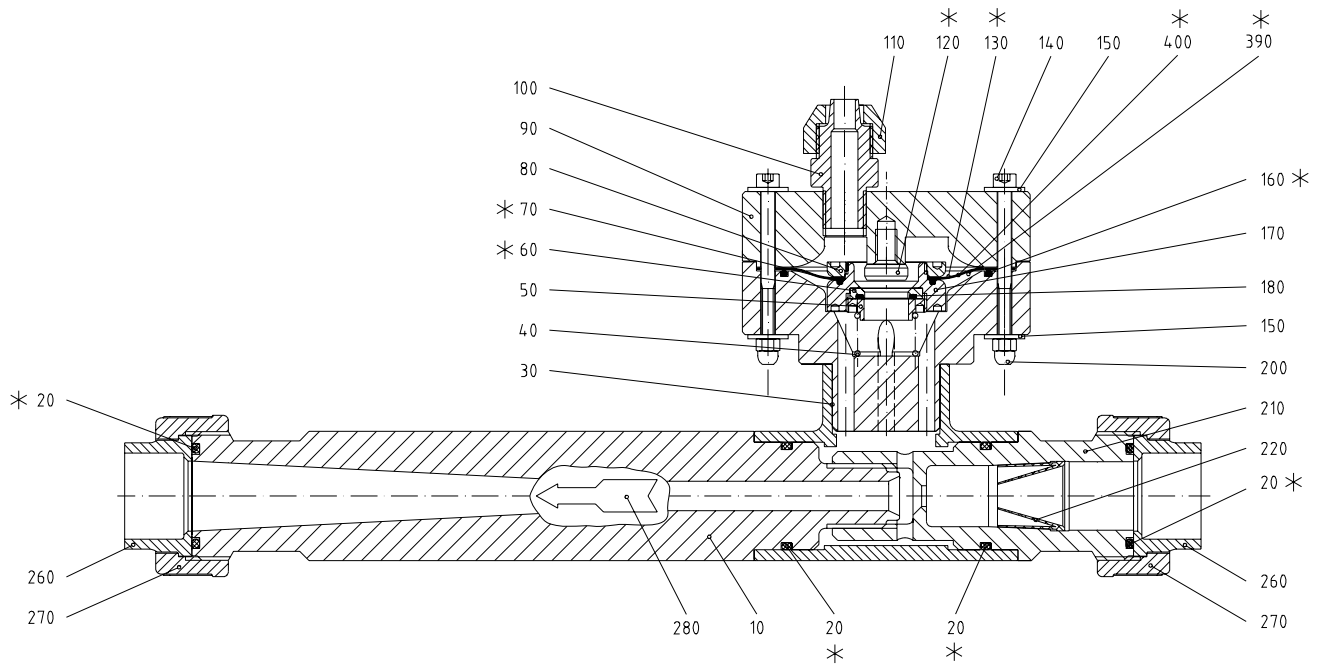


ATTENTION

Do not use sharp objects to clean the nozzles.

Hydrochloride acid has proven to be the most suitable cleaning agent.

Observe the regulations when using hydrochloric acid!



Spare parts set

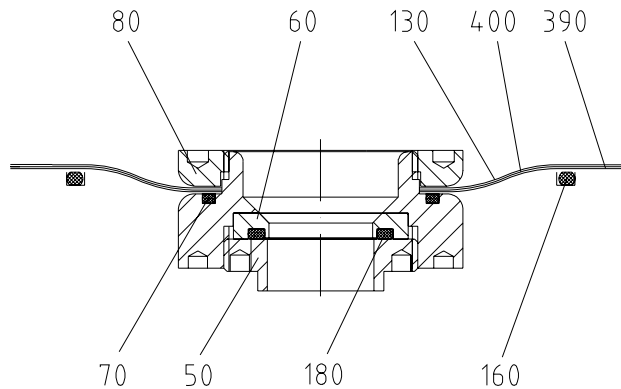
Order No. 553-1033

Pos.	Part No.	Designation	Installation
20	52.153-2	O-ring, Viton	164-4000C to -10000C
60	12.779-4	Seat, PTFE	164-4000C to -10000C
70	52.139	O-ring, Viton	164-4000C to -10000C
120	12.778-4	Piston, PTFE	164-4000C to -10000C
130	12.312-4	Diaphragm, FEP	164-4000C to -10000C
160	52.164	O-ring, Viton	164-4000C to -10000C
180	52.107-1	O-ring, Viton	164-4000C to -10000C
390	12.312-4	Diaphragm, FEP	164-4000C to -10000C
400	12.1770-400	Diaphragm, Viton	164-4000C to -10000C

Checking the diaphragm non-return

If the diaphragm non-return is leaking, the seat and piston must be checked and replaced if necessary.

- Switch off the installation and close the ball valve in the outlet, so that when you open the diaphragm non-return, water cannot escape.
- Remove the vacuum hose from the non-return valve, loosen the screws and remove the upper part.



Replacing the diaphragm

- Remove the diaphragm ring (pos.80) and replace the 3 diaphragms, replace the O-rings (pos. 70) if necessary.



NOTE

The Viton diaphragms are located between the FEP diaphragms!

Replacing the seat and piston

- Remove the screw ring (pos. 50) and replace the seat (pos. 60) with the O-ring (pos. 180)



NOTE

Observe mounting position!

- Replace the piston (pos. 120) in the upper part of the diaphragm non-return

Assembly of diaphragm non-return

- Push the diaphragm disk over the piston. If it closes too easily, tighten the screw ring (pos. 50) slightly.
- Mount upper part onto lower part.



NOTE

If water escapes from the diaphragm non-return when you open the isolating ball valve, tighten the screw ring (pos. 50) again slightly.

- Connect vacuum hose

4.2.6 H2O pump

Here, the operation and tightness of the solenoid valves or H2O pump is checked.

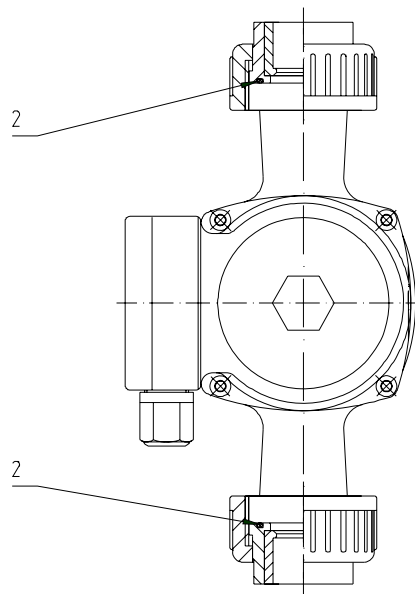
- Switch to “Service operation/Deaeration” mode on the display
- Switch to the “Bypass line” menu
- Switch solenoid valves on to check the operation and tightness, replace solenoid valves if necessary
- Switch to “Service operation/Deaeration” on the display, reset if necessary using the “ESC” key
- Switch to the “H2O pump” menu and activate pump
- The specified amount of water on the display must be within the set tolerances.
- Check tightness of the H2O pump, replace if necessary
- Check connection screws and O-rings (pos. 2) of the H2O pump, replace if necessary



NOTE

Observe mounting position (flow direction)!

- Switch off solenoid valves or H2O pump



5 Tests every 24 months



NOTE

For this test, we recommend replacing the following components!

5.1 Solenoid valves

Bypass line with solenoid valve and flow limiter for the supply line of the run-down tank H₂O

- Replacing the solenoid valve
- Replacing the flow limiter

45.10245-3/4	Solenoid valve 230V, 50Hz	all
45.10249-3/4	Solenoid valve 115V, 60Hz	all
53.625-50	Flow limiter 5 l/min	164-4000C / -6000C
53.625-90	Flow limiter 9 l/min	164-7500C / -10000C

5.2 Impeller counter

Impeller counter (flow meter) in the H₂O line for the predilution of HCl

- Replacing the impeller counter (flow meter)

Part No.	Designation	Installation
12.6010-1	Flow meter FHKU 100	all

5.3 H₂O pump

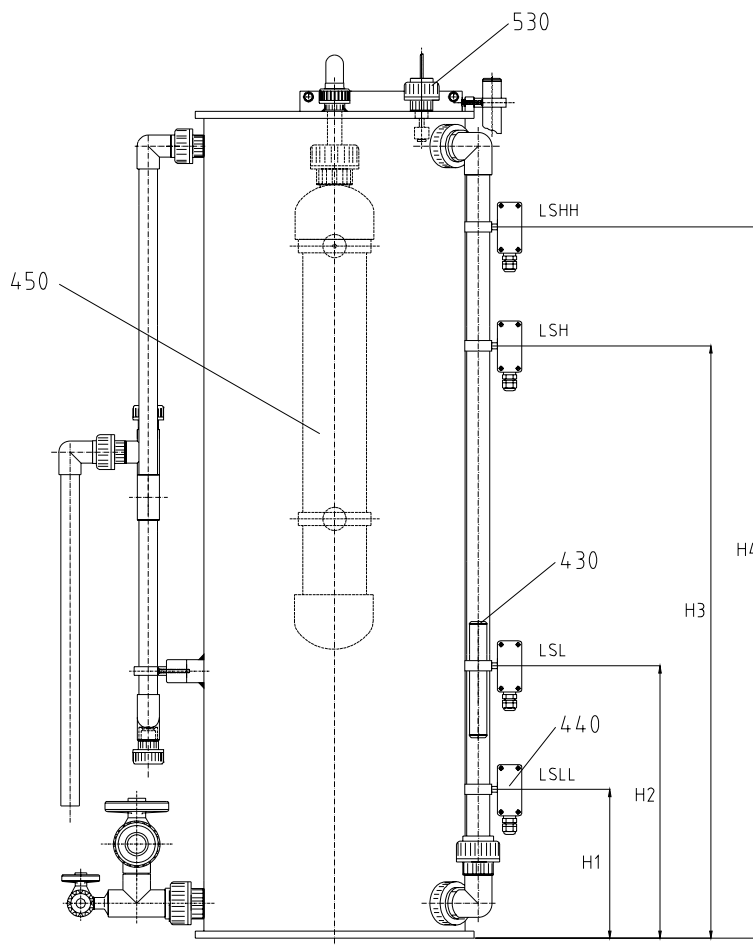
H₂O pump for the water supply for the predilution of HCl

- Replacing the circulating pump

Part No.	Designation	Installation
53.650-001	Bypass pump 230V	all
53.650-005	Bypass pump 115V	all

5.4 Solution container for ClO₂

- Replacing the absorption filter



Spare parts

Pos.	Part No.	Designation	Installation
430	12.5733	Float, PVC	164-4000C to -10000C
440	12.4736	Change-over contact	164-4000C to -10000C
450	12.3768-320	Absorption filter	164-4000C to -10000C
530	12.4908-410	Float switch	164-4000C to -10000C

6 Tests every 5 years



NOTE

For this test, we recommend replacing the following components!

- Replacing the dosing pump for HCl/NaClO₂

7 Start-up



CAUTION

During start-up of Oxiperm C164 installations with concentrated chemicals, the following start-up procedure must be observed:

- 1.) *Selecting the installation and operating mode*
- 2.) *Checking the limit contacts of the flow meter*
- 3.) *Start-up mode, filling the reactor with water*
- 4.) *Filling the water run-down tank*
- 5.) *Deaeration and setting of the pump for H₂O*
- 6.) *Deaeration and setting of pumps for HCl / NaClO₂*
- 7.) *Deaerating the bypass line and setting the bypass water quantity*
- 8.) *Deaerating the suction injector line*
- 9.) *Filling the overflow system on the solution container*



CAUTION

Before the installation is run with chemicals, the reactor must be filled with water! The installation must not be run with chemicals if there is air in the reactor



NOTE

The stroke length of the dosing pumps are factory-set and may be different depending on the size of the installation. When the dosing pump is calibrated, loosen the locking screw under the stroke adjustment button and if necessary adjust the dosing pump to the required consumption data. Then tighten the locking screw again to avoid any unwanted stroke adjustment.



NOTE

During the calibration of the dosing pumps for HCl and NaClO₂, the setting is reduced by approximately 10% - 15% (e.g. setting 50%, calibration at 35% - 40%) in order to perform the first calibration. The dosing pumps are then adjusted to the correct consumption data, depending on the local pressure.



NOTE

The start-up operation can only be carried out by authorised and qualified personnel

Guidelines

Due to current regulations for the prevention of accidents, chlorine dioxide installations can only be started up once they have been inspected by an expert to ensure it is in its proper condition.

Prior to any subsequent start-up, the chlorine dioxide installations must be inspected by an expert. This inspection must be repeated every 6 to 12 months in accordance with regulations.

The operation and servicing of chlorine dioxide installations and the use of chemicals is only permitted to those who are qualified to use them. It goes without saying that these persons reliably fulfil their tasks.

→ See regulations for the prevention of accidents GUV 8.15 and VBG 65 "Chlorination of water"

This is why a start-up is only carried out by trained personnel with the relevant documentation.

7.1 Selecting the installation and operating mode

The installation size and mode are defined in the "Installation selection" menu.

Press "Escape" on the control panel to interrupt entry at any time.



NOTE

The preset installation size flashes in the "installation type" menu, reselect the installation size if necessary. See Section 7.6.1, Installation type

Oxiperm C 164 chlorine dioxide installations can be used in two different modes:

- ☐ Auto / Manual
- ☐ Bus control

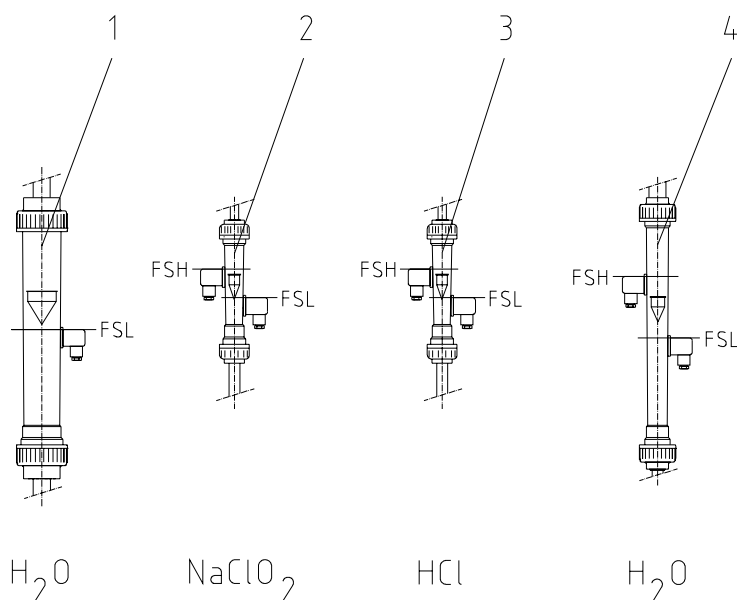


NOTE

The preset mode is displayed flashing; select a new mode if necessary. See Section 7.6.2, Operating mode

7.2 Checking the limit contacts of the flow meter

Before start-up, check the limit contacts of the individual flow meters and adjust if necessary. The MAX and MIN limits are different depending on the size of the installation.



7.2.1 Limit contacts for 164-4000 C

Flow meter (Pos. 1) H2O - Bypass water

MIN contact: 850 l/h

Flow meter (Pos. 2) NaClO2

MAX contact: 26 l/h

MIN contact: 22 l/h

Flow meter (Pos. 3) HCl

MAX contact: 26 l/h

MIN contact: 22 l/h

Flow meter (Pos. 4) H2O - Dilution of hydrochloride acid

MAX contact: 155 l/h

MIN contact: 120 l/h

7.2.2 Limit contacts for 164-6000 C

Flow meter (Pos. 1) H2O - Bypass water

MIN contact: 1400 l/h

Flow meter (Pos. 2) NaClO2

MAX contact: 39 l/h

MIN contact: 34 l/h

Flow meter (Pos. 3) HCl

MAX contact: 39 l/h

MIN contact: 34 l/h

Flow meter (Pos. 4) H2O - Dilution of hydrochloride acid

MAX contact: 230 l/h

MIN contact: 190 l/h

7.2.3 Limit contacts for 164-7500 C

Flow meter (Pos. 1) H2O - Bypass water

MIN contact: 1800 l/h

Flow meter (Pos. 2) NaClO2

MAX contact: 48 l/h

MIN contact: 43 l/h

Flow meter (Pos. 3) HCl

MAX contact: 48 l/h

MIN contact: 43 l/h

Flow meter (Pos. 4) H2O - Dilution of hydrochloride acid

MAX contact: 290 l/h

MIN contact: 240 l/h

7.2.4 Limit contacts for 164-10000 C

Flow meter (Pos. 1) H2O - Bypass water

MIN contact: 2500 l/h

Flow meter (Pos. 2) NaClO₂

MAX contact: 65 l/h

MIN contact: 60 l/h

Flow meter (Pos. 3) HCl

MAX contact: 65 l/h

MIN contact: 60 l/h

Flow meter (Pos. 4) H2O - Dilution of hydrochloride acid

MAX contact: 390 l/h

MIN contact: 330 l/h

7.3 Start-up mode, filling the reactor with water



WARNING

Before the installation is run with chemicals, the reactor must be filled with water!

Switch to "Service operation / Deaeration / Bypass line" menu (also see Section 7.8.1)

Display indicator:	Deaeration	
	1 Bypass	<OFF>
	2 Suction	<OFF>
	3 Rinsing	<OFF>

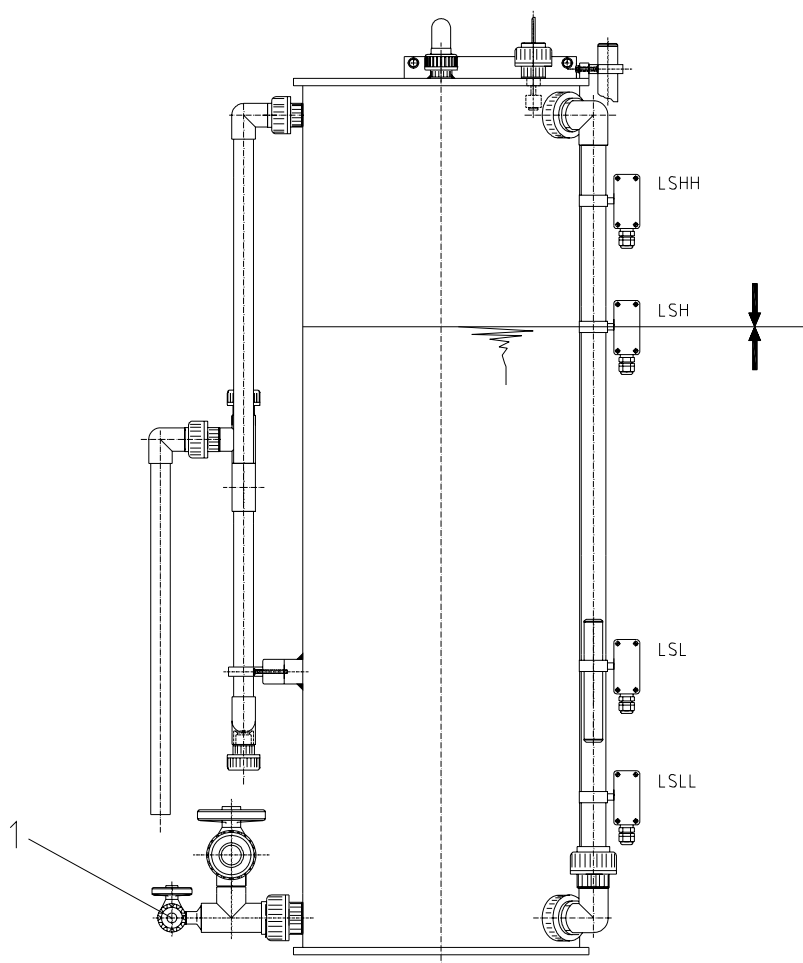


NOTE

The filling process is only complete once the solution container has been filled twice to MAX contact.

- Use the "F3" key to activate the solenoid valve for the rinsing process (Display indicator <ON>)
- Use the "F3" key to deactivate the solenoid valve for the rinsing process (Display indicator <OFF>), if the water level has reached the MAX contact in the solution container (see diagram)
- Use the evacuation ball valve (Pos. 1), to completely empty the solution container, so that no water is left in it or use the dosing pump to pump the water out of the solution container. After it has been emptied, close the ball valve again.

- Repeat the rinsing process a second time, i.e. activate by pressing the “F3” rinsing key
- Use the “F3” key to deactivate the solenoid valve for the rinsing process (Display indicator <OFF>), if the water level has reached the MAX contact in the solution container (see diagram)
- Use the evacuation ball valve (Pos. 1), to completely empty the solution container, so that no water is left in it or use the dosing pump to pump the water out of the solution container. After it has been emptied, close the ball valve again.
- Press the “Escape” key to return to the “Deaeration” menu.



NOTE

It is important to run the rinsing process twice, in order to make sure that no air is left in the reactor before it is used with chemicals and also that any air bubbles which may accumulate either between or in the ceramic rings, have been completely removed!

7.4 Filling the water container

In order to ensure that the installations start up properly, the bypass water line must be deaerated each time it is commissioned, at the same time, the water run-down tank is filled for the dilution water.

Switch to "Service operation / Deaeration / Bypass line" menu (also see Section 7.8.1)

Display indicator:	<i>Deaeration</i>	
	<i>1 Bypass</i>	<OFF>
	<i>2 Suction</i>	<OFF>
	<i>3 Rinsing</i>	<OFF>

- Close ball valve, pos. 4.5 (bypass line), see screen on page 51
- Open ball valve, pos. 5.6 (filling line for water container)



NOTE

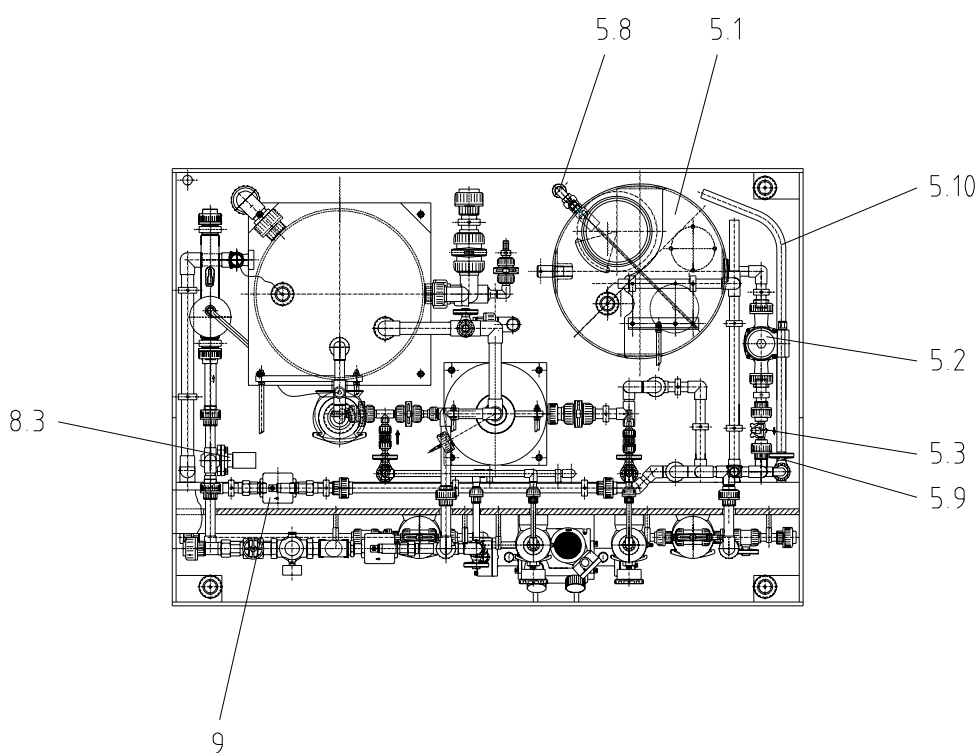
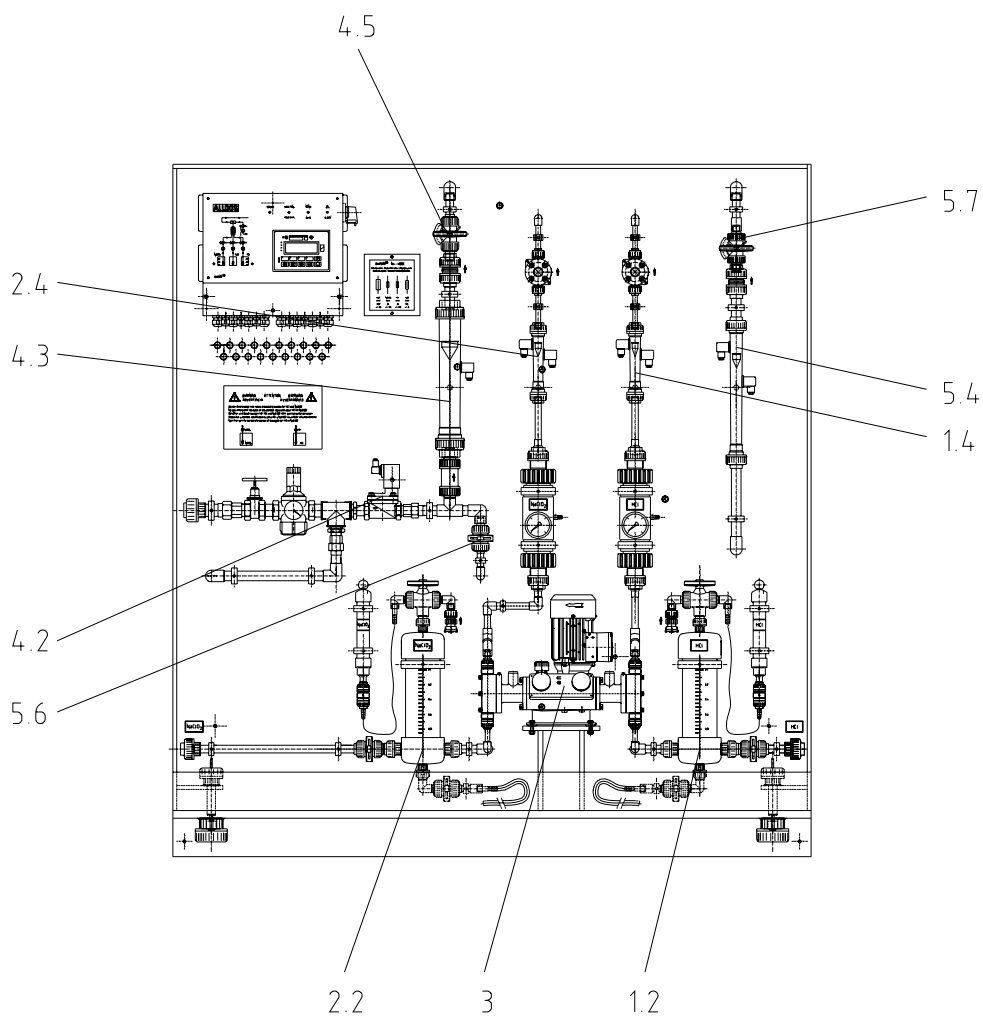
The ball valve (pos. 5.6) must be always be open when the installation is running, so that the water container is always filled.

- Press the "F1" key to activate the bypass solenoid valve (pos. 4.2).

The water run-down tank is filled when water flows through the bypass line of the installation, i.e. the bypass solenoid valve is active.

The water run-down tank is filled by means of the float valve, which stops the water supply as soon as the water container is full.

- Press the "F1" key to deactivate the bypass solenoid valve (pos. 4.2).



7.5 Deaerating and setting the H2O pump

Deaeration

To deaerate the rotary pump (pos. 5.2, screen on page 53), the water container (pos. 5.1) must be filled with water.

- Close the ball valve, pos. 5.7 (dilution water line) and then open it slightly (turn approximately 45° to the left)

Switch to “Service operation / Deaeration / H2O pump” menu (also see Section 7.8.1)

Display indicator: *2 H2O pump* *<OFF>*
 target *XXX l/h*
 actual *YYY l/h*
 1 limit *-xx +xx % >*

- Press the “F2” key to activate the H2O pump (display indicator *<ON>*)
- Place the deaeration hose (pos. 5.10) in a separate container, to collect the leaking water.
- Open the ball valve, pos. 5.9 to deaerate the H2O pump.

The pump is deaerated correctly if the dilution water flows without any bubbles in the measuring tube (pos. 5.4).

- Close the ball valve, pos. 5.9

Setting the water quantity

- Use the ball valve (pos. 5.7) to set the required quantity of dilution water (see Section Power and consumption data)
- Press the “F2” key to deactivate the H2O pump (display indicator *<OFF>*)
- Press the “Escape” key to return to the “Deaeration” menu.

7.6 Deaerating and setting the pump for HCl/NaClO₂



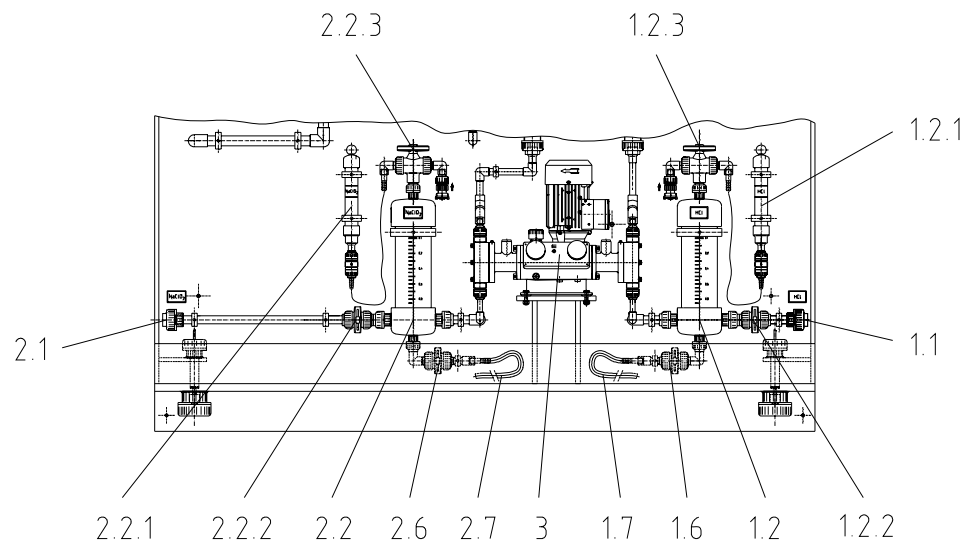
NOTE

The dosing pump for HCl/NaClO₂ is first of all deaerated using water



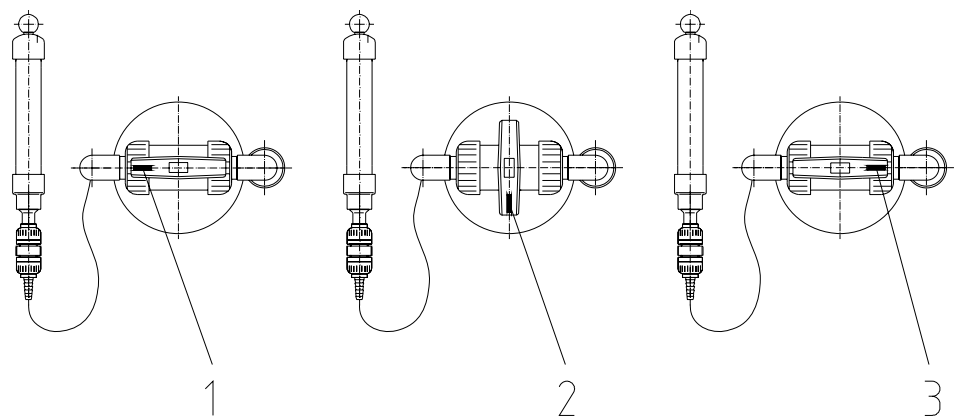
NOTE

The dosing pump is time controlled during the deaeration process and then switches off automatically (approximately 3 minutes runtime). The deaeration process can be stopped at any time by pressing the "Escape" key!



Filling the calibration system with water

- Close the ball valve 2.2.2 and 1.2.2 for the supply of chemicals
- Place the hose 2.7 and 1.7 in a water container and open the ball valves 2.6 and 1.6



- Turn the ball valve to position 1 (white marking points in the direction of the manual vacuum pump)
- Using the manual vacuum pump (pos. 2.2.1 or pos. 1.2.1 ") suction liquid into the calibration system. Fill the calibration system by approximately 50 - 80 %.
- Once it is filled, turn the ball valve to position 2, the calibration system is closed, white marking points to the front.

The ball valves (pos. 2.2.3 and pos. 1.2.3, directly above the calibration systems) are set facing forward upon delivery; i.e. the calibration system is closed, see screen below, pos. 2

**NOTE**

If there is not sufficient water in the calibration system for the deaeration process, the calibration systems have to be filled with water again until the water flows through the flow meter without any bubbles!

**NOTE**

Mirror-inverted arrangement of the calibration systems, but nevertheless using the same procedure as for the filling (white marking points towards the vacuum pump) and calibration (white marking points towards the deaeration valve)

**NOTE**

The calibration systems must be closed whilst the installation is running (automatic or manual operation or bus control)!

Deaerating the dosing pump HCl/NaClO₂

From the main menu, press the “F3” key to switch to the “Service operation” menu, scroll within the main menu if necessary.

- Press “F1” to switch to the “Deaeration” menu.
 Display indicator: *Deaeration*
 1 Bypass line
 2 H₂O pump
 3 Pump HCl/NaClO₂
- Press “F3” to switch to the “Pump HCl/NaClO₂” menu
 Display indicator: *Pump HCl/NaClO₂*
 1 Pump <OFF>
- Press “F1” to activate the dosing pump for the chemicals.

If you press the “F1” key, the rotary pump is activated for the dilution water of the hydrochloric acid. If the float body exceeds the MIN contact in the flow meter, then the dosing pump is activated for the chemicals. For safety reasons, the dosing pump HCl/NaClO₂ is always switched with the pump for the dilution water.

If the MAX/MIN limits of the flow control for the dilution water are either exceeded or are below the limit values, the installation switches off, even though the “F1” key is depressed. An alarm message then appears on the display.

Flow control 1 = impeller counter

Flow control 2 = flow meter

- The dosing pump is deaerated correctly if the liquid flows through the flow meter without any bubbles.

Setting the flow rate of HCl and NaClO₂

Before the calibration systems are filled with chemicals, the existing water must be removed from the calibration system.



NOTE

Only fill the calibration systems with chemicals, if no water is left in the system!

- Open ball valves 1.6 and 2.6
- Set ball valves on the calibration system 1.2.3 and 2.2.3 to pos. 3 (deaeration function)

If there is no more water in the calibration systems:

- Close ball valves 1.6 and 2.6
- Set ball valves on the calibration system 1.2.3 and 2.2.3 to pos. 2 (closed)
- Open the ball valves 1.2.2 and 2.2.2 for the supply of chemicals

The calibration systems can now be filled with chemicals:



NOTE

The calibration systems are filled with chemicals in the same way as they are filled with water. Identical procedure!

- Press "F1" to activate the dosing pump for the chemicals
- Using the hand wheels on the pump, set the required dosing flow via the relevant flow meter. Setting data, see Section 3.1.1 "Power and consumption data)



WARNING

NaClO₂ is extremely temperature-dependent, i.e. depending on the ambient temperature (> or < 20°C) there is the possibility that the value set on the measuring tube does not match the calibration. The display error on the measuring tube could in this case (depending on the difference in temperature) be in the range of +/-10 %. Irrespective of the temperature, the dosing quantities for the chemicals must therefore be calibrated before the installation is switched on.

7.7 Deaerating and setting the bypass line

Switch to "Service operation / Deaeration / Bypass line" menu (also see Section 7.8.1)

Display indicator:	<i>Deaeration</i>	
	<i>1 Bypass</i>	<OFF>
	<i>2 Suction</i>	<OFF>
	<i>3 Rinsing</i>	<OFF>

- Press the "F1" key to activate the solenoid valve for the bypass line (Display indicator <ON>)
- With the ball valve at pos. 4.5, set the required quantity of bypass water, setting data see Section 3.1.1 "Power and consumption data"
- Press the "F1" key to deactivate the solenoid valve for the bypass line (display indicator <OFF>)

7.8 Deaerating the line for the suction injector

Switch to "Service operation / Deaeration / Bypass line" menu (also see Section 7.8.1)

Display indicator:	<i>Deaeration</i>	
	<i>1 Bypass</i>	<OFF>
	<i>2 Suction</i>	<OFF>
	<i>3 Rinsing</i>	<OFF>

- Press the "F2" key to activate the solenoid valve for the suction injector (Display indicator <ON>)



NOTE

If the counterpressure is too great in the outlet, the suction capacity of the suction injector is reduced.

Checking the suction performance

- Remove the vacuum hose from the diaphragm non-return of the suction injector
- Use your thumb to check the suction performance of the injector.
- Reconnect the vacuum hose
- Press the "F2" key to deactivate the solenoid valve for the suction injector (display indicator <OFF>)

